

(1998). Building-Related Illnesses. New England Journal of Medicine, 338, 1070-1071.

To the Editor: As occupational and environmental physicians, we disagree with Menzies and Bourbeau's assessment of building-related illnesses with respect to fungal and bacterial contamination (Nov. 20 issue).¹ In a growing number of investigations we are encountering problems in office workers associated with moisture- and water-related microbial contamination resulting in fungal growth and marked bioaerosol exposure. Building materials made of cellulose are particularly susceptible to fungal growth. The clinically important information with respect to exposure is not necessarily the absolute quantity of colony-forming units, but the fact that fungal species are atypical and that the concentrations are higher than in the outside air, used as a normal reference. In well-documented clinical case evaluations and epidemiologic studies, we and other authors have found clear evidence of an association of mucous membrane irritation, allergy, asthma, and inflammatory effects with allergenic or toxigenic fungal bioaerosol exposures.^{2,3,4,5,6}

Medical treatment of fungal building-related illnesses is primarily aimed at symptoms, and the intervention needs to focus on exposure cessation, moisture control, and antifungal measures. The public and occupational health message is to control flooding, water leaks, and other moisture problems in buildings as soon as possible in order to prevent unnecessary building-related illnesses. Improved industrial-hygiene sampling and characterization of bioaerosol exposure will provide better data so that the examining physician can improve the assessment of clinical outcomes and establish a correct diagnosis of building-related illnesses.

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To the Editor: In their review of building-related illnesses, Menzies and Bourbeau comprehensively cover physiologic and environmental theories of causation while minimizing the possibility of psychosocial factors. The authors simply state, "The association of symptoms with psychosocial factors does not mean that 'the problem is all in the workers' heads.' " Apparently, concern about stigma continues to make psychosocial causes undesirable candidates in the differential diagnosis.

Few would debate the evidence of discrete causes of specific building-related illnesses. However, nonspecific building-related illnesses remain a conundrum, and some evidence suggests that nonphysiologic factors deserve more serious consideration. Menzies and Bourbeau cite seven studies, involving 21,762 patients, that found an association between psychosocial factors and nonspecific building-related illness, and none that showed the absence of an association (their Table 2). In a landmark study, changes in ventilation failed to ameliorate the symptoms of the sick building syndrome.¹ Three recent reviews suggest an important contributory role of psychosocial factors in some patients.^{2,3,4} Moreover, physical symptoms are exceptionally prevalent in both clinical and community populations and often remain unattributable to a discrete disease.⁵ Psychosocial factors should not be narrowly defined as simply depression, anxiety, or other psychiatric disorders. Worries about the meaning of symptoms and increased attention to normal bodily sensations may contribute to the reporting of symptoms in the absence of a specific disease.

This is not to say that nonspecific building-related symptoms are not real or are "all in the head." However, the exhaustive search for occult environmental causes (and the ensuing disruption of the workplace) should not preclude due consideration of nonphysiologic causes. Psychosocial factors merit a fairer hearing.

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The authors reply:

To the Editor: Dr. Kroenke's comments are valid. Psychosocial factors, such as job-related stress¹ or job-related strain,² have been associated with a greater prevalence of symptoms in cross-sectional studies of nonspecific building-related illnesses. An index of psychosocial dissatisfaction has been associated with the initial prevalence of symptoms, as well as with the incidence of new symptoms during follow-up.³ We agree that such psychosocial factors should not be narrowly defined and that they merit serious consideration. Whether job-related stress or strain, which results from high psychosocial demands and low latitude in decisions, causes symptoms or mediates a change in the susceptibility to symptoms requires further investigation.

Johanning and colleagues appear to disagree not with our assessment of the potential importance of microbial contaminants but rather with our assessment of the strength of the current evidence. One of the studies they cite⁴ is an uncontrolled case series of chronic fatigue syndrome in which persons reported the relief of symptoms after they had moved out of the contaminated environment or the contaminant had been removed. Another study that **Johanning** and colleagues cite⁵ compared workers in a work area known to be problematic with a nonexposed reference group. The workers in the problematic area reported significantly more symptoms, but objective measures, such as antibody response, did not differ between the two groups. Given the potential for selection and reporting bias in these studies, we would be much more cautious than **Johanning** and colleagues in interpreting the results as strong epidemiologic evidence. The review the authors cite⁶ similarly concluded that the evidence of an association of symptoms with indicators of fungal exposure was strong but that the evidence of an association of symptoms or objective health measures with measured microbial levels was much less consistent.

In our review, we outlined the considerable indirect evidence suggesting that microbial contamination may play a part in the pathogenesis of nonspecific building-related illnesses, and we recommended avoiding or eliminating potential sources of microbial proliferation. Our recommendations are more

cautious than those of **Johanning** and colleagues but are better supported by the current epidemiologic evidence. Given the indirect evidence, as well as the considerable body of experience, it is likely that fungi and other microbes are important. Their role must be more precisely defined to allow more rapid diagnosis and effective intervention, in order to improve the health and well-being of workers in modern nonindustrial environments.

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